

BARRIERS AND FACILITATORS TO CERVICAL CANCER SCREENING IN DEVELOPING COUNTRIES

by

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Abstract

Background: Every year, approximately 250,000 women die of cervical cancer, a preventable disease. Nearly 90% of those deaths occur in developing countries. Incidence and mortality rates of cervical cancer in developed countries have decreased approximately 80% since the Pap smear was incorporated into the public health system and regular screening was recommended. The success of this system has not been experienced in developing countries and as a result, the burden of cervical cancer disproportionately affects women with the fewest resources to treat it.

Objectives: The primary aim of this thesis is to conduct a literature review to identify barriers and facilitators to cervical cancer screening in developing countries. Secondly, the researcher is an intern with the nonprofit organization, Basic Health International (BHI). In an effort to improve the low screening rates in El Salvador, one of the countries where BHI works, the researcher proposes a study to identify the barriers and facilitators to cervical cancer screening for women in rural El Salvador.

Methods: The researcher used the University of Pittsburgh Health Sciences Library including PubMed, and EBSCO to search for literature on this topic. Relevant articles included

those published between 1995 and 2012, addressing barriers and facilitators to cervical cancer screening in developing countries.

Results: Twenty-two articles were chosen for review based on the specified exclusion and inclusion criteria. The articles were analyzed using the Social Ecological Model and geographic region. The majority of the literature addressed individual level factors that affect screening behavior of women in developing countries.

Conclusions: The literature search revealed that there are multiple levels and channels through which public health professionals can intervene, while the individual level factors paint a picture of who is least likely to be screened. In looking forward, there is a possibility of targeting women for intervention using these profiles. Furthermore, the public health relevance of the literature search is that it emphasizes the role that culture plays on health behaviors, and the importance of identifying the barriers and facilitators to cervical cancer screening in a population.

TABLE OF CONTENTS

PREFACE.....	X
1.0 INTRODUCTION.....	1
1.1 STATEMENT OF PROBLEM.	1
1.1.1 Worldwide Epidemiology	2
1.1.2 El Salvador.....	2
1.1.3 Importance of Prevention:Vaccination and Screening.....	3
1.1.4 Case Study: The United States Cervical Cancer Screening Program.....	4
2.0 METHODS.....	4
2.1 INCLUSION AND EXCLUSION CRITERIA	4
2.2 LITERATURE SEARCH PROTOCOL	5
3.0 RESULTS.....	6
3.1 SUMMARY OF STUDIES	7
3.2 QUALITY OF STUDIES.....	13
3.3 DEVELOPMENT OF THEMES	13
3.3.1 Social Ecological Model	14
3.3.2 Barriers and Facillitators: Overview	15
3.3.3 Barriers and Facilitators: Geography.....	19
4.0 SURVEY PROPOSAL.....	23

4.1	INTRODUCTION	23
4.2	BACKGROUND	24
4.3	RESEARCH DESIGN AND METHODS	29
4.3.1	Project design	29
4.3.2	Measures	29
4.3.3	Subjects.....	30
4.3.4	Procedures	30
4.4	PRETESTING	31
4.5	METHODS OF ANALYSIS	32
5.0	IMPLICATIONS.....	34
6.0	LIMITATIONS.....	34
7.0	CONCLUSIONS	36
	BIBLIOGRAPHY.....	38

LIST OF TABLES

Table 1: Summary of studies.....	7
Table 2: Barriers and Facilitators to screening organized by Social Ecological Model.....	16
Table 3.1 Barriers and facilitators to screening in Africa.....	19
Table 3.2 Barriers and facilitators to screening in Asia.....	19
Table 3.3 Barriers and Facilitators to screening in Latin America.....	20

LIST OF FIGURES

Figure 1. Flow Chart of Literature Search.....	5
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PREFACE

I am grateful to Basic Health International, especially Miriam Cremer and Lauren Ditzian, for choosing me for their internship program, for inviting me into the Basic Health family and patiently teaching me the ways of international public health. You gave me the independence to create my own project, and the skills and guidance to see it come to fruition. I am fully aware that you have provided me with an incredible, unique experience in nonprofit work, and I will always feel indebted to the first organization that gave me a chance to see what I could do.

I would not be where I am today without the support of my family and friends. Thank you for every phone call, care package, text message, email, that you sent my way. Your encouragement has been invaluable.

Lastly I'd like to thank the community at GSPH, especially the Department of Behavioral and Community Health Sciences. It has been my privilege to spend the last 2 years surrounded by faculty and students who are passionate about public health. They have shown me that compassion with diligent research, good planning, and continuous evaluation can improve health outcomes even in the worst circumstances. Thank you to my adviser and professors for teaching me how to be a part of the solution.

1.0 INTRODUCTION

The primary aim of this research paper is to perform a literature review to identify barriers and facilitators to cervical cancer screening in developing countries. The researcher is an intern with the nonprofit organization, Basic Health International (BHI). The mission of BHI is to eradicate cervical cancer in Latin America. In an effort to improve the low screening rates in El Salvador, one of the countries where BHI works, the researcher proposes a study to identify the barriers and facilitators to cervical cancer screening for women in rural El Salvador.

1.1 STATEMENT OF THE PROBLEM

It is important to understand the extent of the public health burden that cervical cancer places on some of the world's most vulnerable women. It is also critical to understand the importance of screening and why it is the best option for decreasing cervical cancer mortality. This section will therefore describe the burden of cervical cancer on women in low and middle-income countries, the need for screening among these women, and will conclude by specifically describing the burden of cervical cancer in El Salvador, where the researcher proposes a study to identify screening barriers and facilitators.

1.1.1 Worldwide Epidemiology

Cervical cancer is the 4th leading cause of cancer death in women worldwide and its public health burden is significant. In 2008, it was estimated that there are approximately 500,000 new cases of cervical cancer annually, killing more than 250,000 every year [1]. Nearly 90% of these cases occur in low-income countries (WHO.org). As defined by the World Bank, a low-income country has a gross national income (GNI) of \$4,035 or less (World Bank). Women die from cervical cancer at a relatively young age [2]. Every woman who dies from this preventable disease before the age of 70 accounts for an average of 17 potential years of life lost [3]. In low-income countries approximately 3.4 million women-years of life are lost to this disease annually [3]. The highest rates of cervical cancer occur in Eastern, Western, and Southern Africa. Other areas of high incidence are South-Central Asia and South America. The lowest rates are found in North America, Australia/New Zealand, and Western Asia [1].

1.1.2 El Salvador

In El Salvador, cervical cancer is the most common type of cancer in women with a crude incidence of 35.4/100,000, compared to 20.6 in Central America and 15.8 in the world. The incidence and mortality rates in El Salvador are the third highest in Central America. The mortality rate is 17.4 in El Salvador, compared to 10.1 in Central America, and 7.8 in the world. The risk ratio of cervical cancer is 1.9% compared to 1.2 in Central America and 0.9 in the world (WHO.org).

1.1.3 Importance of Prevention: Vaccination and Screening

There are two main strategies in preventing cervical cancer today: regular screening using Pap smear and vaccination. Advancement in the understanding of cervical cancer pathology has grown significantly in the past decade. It is now known that virtually all cervical cancer cases are caused by persistent, untreated infection by one of the 15 known carcinogenic forms of Human Papillomavirus (HPV), considered “high-risk” HPV infections [2]. In 2006, the Federal Drug Administration licensed Gardasil, a vaccine that protects against strains 6, 11, 16, and 18 of the HPV. The HPV vaccine is recommended for girls and women ages 11-26 and boys ages 9-26 in the U.S. (CDC). Because the development of the HPV vaccine and its incorporation into public health system has only occurred recently, it is too soon to know how the vaccine will affect cervical cancer in this population.

The most effective strategy for decreasing incidence and mortality of cervical cancer is regular Pap smear screening with the support of a strong public health infrastructure. The slow-progressing nature of cervical cancer is the main reason that screening is extremely effective in the case of this health issue. In most cases, cervical cancer takes 15-20 years to progress from precancerous cells to an invasive cancer. However as the cancer progresses survival rates decrease from 93% in stages 0 and IA, 80% in IB, 63% in IIA, 58% in IIB, 35% in IIIA, 32% in IIIB, 16% in IVA, and 15% when it has progressed to its most advanced stage (American Cancer Society). Regular screening habits increase the likelihood that any precancerous or cancerous cells will be detected early and can be treated.

1.1.4 Case Study: The United States Cervical Cancer Screening Program

In the U.S. and other developed nations, the standard of care for cervical cancer prevention is Pap smear examination for women starting at age 21 every three years until the age of 29. Women aged 30-65 should get a Pap smear and HPV test every 5 years or Pap test alone every 3 years [4]. These screening tests are followed up with treatment and removal of any cancerous or precancerous cells.

The incorporation of this preventative screening and treatment strategy into the public health infrastructure has led to a decrease in cervical cancer incidence and mortality rates in developed countries of nearly 80% over the past 50 years; however the same results have not occurred in developing countries (iarc.org). This system is often not feasible in developing countries.

The purpose of this paper and literature search is therefore to summarize the literature that addresses cervical cancer screening programs in low-income countries, specifically the barriers and facilitators that influence screening of different populations in low-income countries.

2.0 METHODS

2.1 INCLUSION AND EXCLUSION CRITERIA

The inclusion criteria used for this literature search were papers published since 1995 and addressing cervical cancer screening and/or incidence in low-income countries. The researcher also included papers that addressed programs that combined both breast and cervical cancer

screening. Papers were excluded if published prior to 1995, not published in peer-reviewed journal articles, were not available in English or Spanish, and were not available to the researcher for free through the University of Pittsburgh Library system.

2.2 LITERATURE SEARCH PROTOCOL

The flow chart below describes the logic behind the execution of the literature search conducted by the researcher.

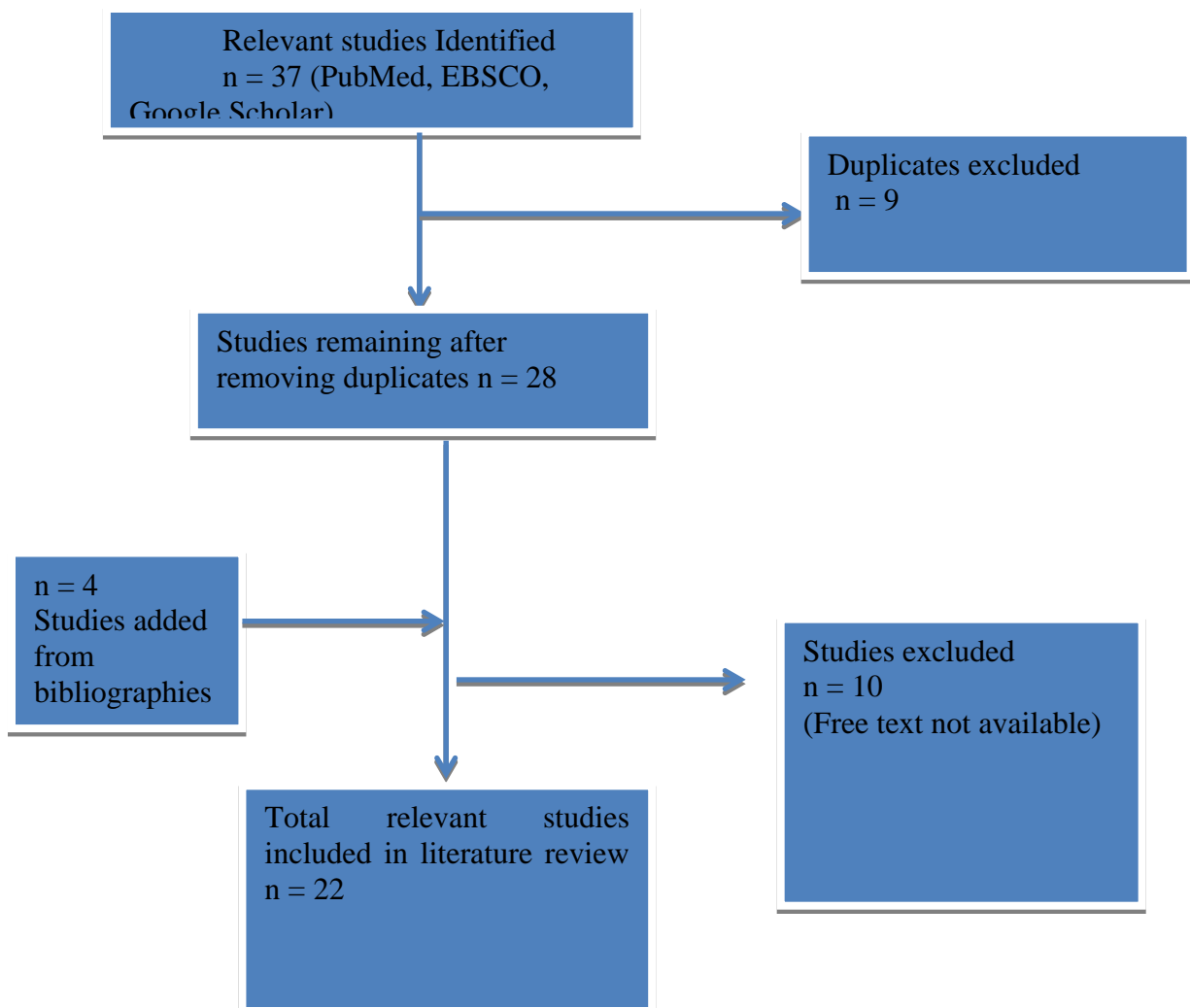


Figure 1 Flow chart of literature search

3.0 RESULTS

This section will present the studies selected for review including information on author and year, country of study, sample size and population, type of study and key findings.

3.1 SUMMARY OF STUDIES

Below is a table summarizing the studies identified through the literature search.

Table 1: Summary of studies

Year Published/First Author	Region	Type of Study/Study Design	Population	Sample Size	Key Findings
2010 Arrossi, S. [5]	Argentina	Situational analysis of provincial cervical cancer programs	Heads of cervical cancer prevention programs, member of the Argentine Cytology Society, heads of cytology and gynecology services at hospitals, leaders of NGOs, heads of reproductive health at MOH.	19	National guidelines without quality controls and monitoring and evaluation system does little to improve screening coverage rates.
2007 Winkler, J. [6]	Peru	Case-Control	Women exposed to health promotion educational activities	301	Women who first seek medical attention at a health facility when they are ill (compared to those who treat themselves at home) were twice as likely to be screened, the higher her level of wealth, the more likely a woman is to be screened, the more satisfied she is with previous experiences in healthcare facilities the more likely she is to be screened, and the more women that she knows socially who have been screened the more likely she is to be screened herself.
2003	India	Cluster randomized-	Women in the Dindigul District in south India	30,577	Younger, educated, married, multiparous, low-income women had a

Table 1 Continued

Sankaranarayanan, R. [7]		control trial			higher compliance with screening.
2006 Basu, P. [8]	India	Descriptive cross-sectional	Women who were noncompliant with invitations to attend screening	469	Most common responses for noncompliance including not needing a check up, being scared of the test, knowing someone who had a bad experience with the test.
2007 Nene, B. [9]	India	Cluster randomized-control trial	Women in Maharashtra, India invited to participate in a screening intervention	79,449 screened, 21,351 unscreened	Predictors of screening include younger women (30-39), higher education level, and experience using contraception
2009 Othman, N.H. [10]	Malaysia	Literature Review	N/A	N/A	Individual invitations to screening facilitate screening, long lines and waiting times are barriers to screening, as well as a shortage of cytoscreeeners. Rural women are less likely to be screened than women living in urban settings.
1999 Swaddiwudhipong, W. [11]	Thailand	Cross-sectional study evaluating mobile health clinic intervention	Women living in 54 rural villages in Tak Province, Thailand	3 year study Year 1: 1603 Year 2: 1369	Mobile health clinics are a facilitator of screening in rural populations, especially women over the age of 45, and increases knowledge and awareness of cervical cancer and importance of screenings.

Table 1 Continued

				Year 3: 1576	
2012 Thanappapasr, D. [12].	Thailand	Cross-sectional	Healthcare providers at Ramothibodi Hospital in Bangkok	1,365	The most common response (27.1%) as to why they had not been screened was that they were not at risk.
2004 Agurto, I. [13]	Venezuela, Ecuador, Mexico, El Salvador, and Peru	Empirical qualitative study	Men, women, HCP	Varying based on country	Women reported concerns about privacy, specifically being interrupted during a pelvic exam, or being examined in a corridor
2003 Mauad, E.C. [14]	Brazil	Cross-sectional	Women living in rural Barretos County in Sao Paulo state	7,192	A facilitator to screening attendance was a visit from a community healthcare agent to the homes of women, as well as advertising on local popular radio stations
2011 Chigbu, O.C. [15]	Nigeria	Qualitative interviews	Women attending gynecologic clinics of 3 health clinics in Enugu, Nigeria	3712	Poor health-seeking behavior and fear of violation of privacy are the major reasons for nonadherence to screening
2002 Claeys, P. [16]	Nicaragua	Population-based questionnaire (face-to-face	Proportional stratified two-stage cluster sampling	612 Men 634 Women	Negligence, absence of medical problems, fear, lack of knowledge and economic reasons were the main reasons women gave for not getting screened.

Table 1 Continued

		interviews)			
2010 Tung, W.C. [17]	Taiwan	Descriptive, Cross-sectional study	female hospital workers	222	Women with higher self-efficacy have higher rates of screening.
2010 Wall, K.M. [18]	Mexico	Case-control	Sexually active female store clerks	94 cases, 147 controls	Having no or inaccurate knowledge of screening guidelines was associated with nonadherence to screening.
2006 Mutyaba, T. [19]	Uganda	Descriptive cross-sectional study	Medical workers at Mulago Hospital, Uganda	285	Most common reasons of female respondents for not being screened were not feeling at risk, lack of symptoms, test being unpleasant or not being at a risky age.
2003 McFarland, D.M. [20]	Botswana	Descriptive study/Questionnaire	Network sampling of women aged 30 or older living in Gaborone, Botswana	30	Barriers identified include: inadequate knowledge, providers' negative attitudes, limited access to doctors
2003 Claeys, P. [21]	Kenya	Descriptive, observational study	Women who attended one of the clinics as part of the Family Planning Association of Kenya.	10,830	Incorporating cervical cancer screening into existing family planning services, facilitates screening for women already using their services, but is not sufficient to reach the most high-risk in the population.
2011 Mwanahamuntu	Zambia	Evaluation of cervical	Women seeking healthcare from Zambia public health system	N/A	Partnership with existing disease-specific health programs can lead to an

Table 1 Continued

, M. [22]		cancer screening intervention			increase in cervical cancer screening for high-risk women, (i.e. HIV/AIDS treatment/prevention programs)
2007 Obi, S.N. [23]	Nigeria	Retrospective, descriptive analysis	Pap smear registry at the Medical Women Association Centre in Enugu, Nigeria	932	Providing subsidized screening increases participation by women of lower SES. Providing referrals increases likelihood of getting screened.
2007 Perkins, R.B. [24]	Honduras	Cross-sectional	Women exposed to the radio health promotion campaign in Yuscaran, Morocelli, and Jicarto villages	Control groups: n=124, n=243 Intervention group: n=233	Increasing education of at-risk women increases both the knowledge of cervical cancer as well as screening practices.
2006 Suba, E.J. [25]	Vietnam	Systems analysis/interviews	health department directors and vice directors, nurses, hospital directors, cytotechnologists, laboratory directors, gynecologists, community outreach leaders, pathologists	45	Higher prices for screening reduces women's participation in a cervical cancer screening program. Grant donor goals not linked to population coverage, goals of political leaders often not linked to program coverage. Reimbursement for screening or lab fees is often inversely linked to screening rates high-risk groups of women.
2008 Reyes-Ortiz,	Latin America and the Caribbean	Cross-sectional study	Women from 7 cities in Latin America and the Caribbean	6357	Having public health insurance or no health insurance predicts lower screening rates than women with private

Table 1 Continued

C.A. [26]					insurance.
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Twenty-two published articles were reviewed including eight conducted in Asia, eight throughout Latin America, and six in Africa. All studies were published in peer-reviewed journals between 1999 and 2012. Several themes emerged from the studies. Many barriers and facilitators were described and many of these were consistent across geographic regions.

3.2 QUALITY OF STUDIES

There was a great deal of variance between the studies that were reviewed in terms of sampling technique. Several of the studies used convenience sampling techniques [12, 19, 20], and the results of these studies, although still valuable, are not representative of the general population. In addition, there is a great deal of variability in the sample sizes amongst the studies ranging from 19 [5] to nearly 80,000 [9]. Smaller sample sizes tend to have larger standard errors and therefore are considered less reliable estimates of the population being studied.

3.3 DEVELOPMENT OF THEMES

This section will first present a model used to help organize and interpret themes from the literature, followed by an overview of barriers and facilitators to cervical cancer screening. Secondly, this section will present several tables organizing barriers and facilitators based on the social ecological model, followed by geographic regions of the world.

3.3.1 Social Ecological Model

Health theories can be used to help organize factors that are related to a given health problem and shape future programs and interventions. The researcher chose to use the social ecological model (SEM) because of its emphasis on multiple levels of influence, and its use in literature searches and program development in a variety of public health issues. Some of these topics include obesity prevention [27], HIV prevention in female sex workers [28], vaccine uptake [29], among other topics. The SEM helps to understand factors affecting behavior and implies that behaviors both shape and are shaped by the social environment (Glanz). The five constructs of the SEM are described below.

- Public policy: local, state, and national laws and policies.
- Community: relationships between organizations, institutions, and informal networks within defined boundaries.
- Organizational: social institutions with organizational characteristics, and formal and informal rules and regulations for operations.
- Interpersonal: formal and informal social networks and support systems, including family, friendships, and work groups.
- Individual: Characteristics of the individual including knowledge, attitudes, behavior, self-concept, skills, etc. This includes the developmental history of the individual.

Below Table 2 will describe barriers and facilitators organized by the constructs of the SEM.

3.3.2 Barriers and Facilitators: Overview

A major disparity exists in rates of cervical cancer incidence and mortality between developed and developing countries. This difference can be explained by several factors. On the level of public policy, the successful cervical cancer screening systems all have national or statewide guidelines for screening.

The previously described screening efforts also require strong community level factors to maintain. Specifically, once the test is performed, the results must be processed and read by a trained cytologist using lab equipment. Using cytology requires quality control to ensure that the tests are being read and processed correctly. After the test is read, the patient must be notified of the results and whether follow-up is necessary.

The most significant obstacle to the Pap smear system's success is that it requires potentially several clinic visits by the patient. This can be maintained with strong organizational-level organization including contacting the patient and keeping records of screening practices of women at risk. However in developing countries, many women who are screened initially never return for follow-up. In addition, the necessity of multiple steps means that there are many opportunities for error, especially in a low-resource setting that lacks a strong public health infrastructure. Limited funds and resources are stretched and competing health issues further exacerbate these issues [30]. Table 2 presents barriers and facilitators organized by the constructs of the social ecological model.

Table 2: Barriers and Facilitators to screening organized by Social Ecological Model

Social Ecological Model Construct	Facilitators of Screening	Barriers to Screening
Public Policy	Private health insurance [26]	Public or no health insurance [26], inconsistent screening guidelines within country [5], No registry system to keep track of who has been and needs to be screened [5]
Community	Cervical cancer programs partnering with existing public health programs [22], use of local radio broadcasting programs as an avenue to increase education on cervical cancer [14, 31]	Incorporating cervical cancer screening into maternal/child health/family planning clinics [5, 21]
Organizational	Mobile screening units [11], personal invitations to screening [5, 10, 11], low cost of exam [15, 23], living close to a screening center [15], free exam [15], High level of satisfaction from previous healthcare experiences [6]	Living too far from screening center [15], test is too expensive [15], negative staff attitudes [20], limited access to doctors [20]
Interpersonal	Being married [11, 23], physician recommendation [15], Knowing women socially who have been screened [6], having a male partner who is supportive [6], participating in awareness-raising events [6]	Never having been married [11], being currently unmarried [23], no family history of cervical cancer [15], having a male partner who is not supportive of screening [13, 18]
Individual	Development of symptoms [15], having adequate information on the test and/or screening guidelines [15, 18], being of low socio-economic status (when screening is subsidized) [23], using contraception [9, 23], Women first seeking medical attention from a physician when ill [6], high income [6], being young [9]	Being elderly [11], not feeling at risk [19], no symptoms [15, 19, 20], fear of exam [18-20], fear of outcome of results [15, 18], lack of interest [19], thinking that test is unpleasant [19], believing that they are not at risky age [19], feeling of violation of privacy [15], lack of adequate information [14, 15, 18, 20], belief

Table 2 Continued

		that screening brings bad luck [15], having no time [15], mistrust of providers [20], high socioeconomic status (when screening is subsidized) [23], low education [11, 18], being poor [18]
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Many of the studies used demographic data to draw conclusions on what predicts or prevents women to be screened, which explains the high number of individual level factors that emerged from the literature search, and also the lack of public policy level factors. Only two studies addressed public policy issues in cervical cancer screening [5, 26]. Reyes-Ortiz et al. revealed that a country's health insurance policies and access are important to women's screening behaviors. Women who have private insurance were more likely to be screened, and women with only access to public health insurance or without any health insurance were less likely to be screened [26]. Arrossi et al. found that having inconsistent guidelines on screening policies throughout a country and lack of a national registry system were barriers to cervical cancer screening.

Community level factors revealed interesting results. Three studies described incorporating cervical cancer screening into existing health programs [5, 21, 22]. Claeys, et al and Arrossi, et al. both describe efforts to incorporate cervical cancer screening into family planning and maternal/child health services. Both found that this succeeded in serving the women who already attend the clinic, but report that this strategy did little expand coverage to women considered high risk. Claeys, et al. discovered that the average age of diagnosis in the population of interest was 52 years old; however the average woman seeking treatment at the family planning clinic was much younger. The third study to address combining public health

programs was based on a very successful program that joined cervical cancer screening and HIV/AIDS prevention [22].

Organizational factors varied between studies. The most common organizational level facilitators were a low cost screening test [15, 23] and receiving a personal invitation to be screened [5, 11]. Distance from a screening facility was also a factor in screening behaviors. One study examined the effectiveness of mobile units for screening in rural areas, and found that screening rates increased amongst women who do not live near a clinic or screening center [11]. Some studies uncovered the importance of a woman's experience with healthcare providers and clinic staff. McFarland et al. report that negative staff attitudes were a barrier to screening and Winkler et al. state that a high level of satisfaction with previous healthcare experiences is a facilitator to screening.

There were several interpersonal factors described in the literature. A woman's relationship with her male partner was the most common relationship studied in the literature [6, 11, 13, 18, 23]. Having a supportive male partner was a facilitator to screening [6] and the absence of that support was a barrier [13, 18], which may explain the studies which claim that being married or having been married is a facilitator to screening [11, 23].

The majority of the barriers identified in the literature search are individual factors. The most commonly cited were fear of the exam [18-20], lack of knowledge about cervical cancer screening and guidelines [15, 20], and having no symptoms [15, 19, 20]. The most common individual-level facilitators of screening are having adequate information on cervical cancer screening and guidelines [15, 18]. Winkler et al. found that high income was a predictor of being screened, while Obi et al. reported that low socioeconomic status facilitated screening in programs where the exam is highly subsidized.

3.3.3 Barriers and Facilitators: Geography

Tables 3.1-3.3 describe facilitators and barriers in the literature related to geographic region.

Table 3.1 Barriers and facilitators to screening in Africa

Africa	Facilitators of Screening	Barriers to Screening
	Symptoms of poor health [15]	Concern with lack of privacy [15]
	Knowledge and understanding of cervical cancer	Concern that test will would take away virginity
	Physician recommendation [15]	Youth
	Low price of exam [15]	Not feeling at risk [19]
	Free exam [15]	No symptoms [15, 19, 20]
	Increased age	Fear of exam [19]
	Close proximity to screening location [15]	Lack of interest[19]
	Cervical cancer programs partnering with existing public health programs [22]	Believing that the test is unpleasant [19]
	Using contraception [23]	Believing that they are not at a risky age [19]
		Incorporating cervical cancer screening into family planning clinics [21]
		Poor health-seeking behavior [15]
		Fear of outcome of exam [15]
		Living too far from screening center [15]
		Belief that screening brings bad luck [15]
		Test too expensive [15, 20]
		Inadequate/lack of knowledge [20]
		Negative staff attitudes [20]
		Mistrust of providers [20]

Table 3.2 Barriers and facilitators to screening in Asia

Asia	Facilitators/Predictors to Screening	Barriers/Predictors of No Screening
	Personal invitations to be screened/reminder system [10, 11, 17]	Long waiting times at clinics [10]
	Good, affordable public transportation system	Not being aware of screening importance
	Mobile screening unit[11]	Low education level [9]
	Being married or ever having been married [11]	Elderly [9, 11]
	Younger [9, 17]	Belief that they are not at risk
	Having been pregnant multiple times [9]	Belief that test is unnecessary
	Using family planning services [9]	Feeling shy
	Previous contact with healthcare system [9]	Having no signs or symptoms
		Feeling that they are too busy [10]
		Being unmarried [11, 17]
		Never having children [9]
		Having a male partner/spouse who is supportive [9]

Table 3.3 Barriers and Facilitators to screening in Latin America

Latin America	Facilitators/Predictors to Screening	Barriers/Predictors of No Screening
	Use of community healthcare agents [14]	Anxiety about potential bad results [13]
	Use of advertisement campaign for awareness/education [14]	Living in a rural area [14]
	Use of local radio programs to promote awareness/education [14, 31]	Poor/lack of cervical cancer education from general practitioner
	Women first seeking medical attention from a physician when ill [6]	Women who self-treat when ill [6]
	High income [6]	High doctor to patient ratio in population [13]
	High level of satisfaction from previous healthcare experiences [6]	Disregard for one's own health [13, 16]
	Knowing more women socially who have been screened [6]	No insurance [26]
	Supportive male partner [6]	Inconsistent screening guidelines within country [5]

Table 3.3 Continued

	Attending cervical cancer educational events [6]	No registry system to keep track of who has been and needs to be screened [5]
	Private insurance [26]	Poor quality of testing [13]
	Knowledge of cervical cancer/screening guidelines [18, 31]	Long wait times at clinic/hospital [13]
	Desire for peace of mind regarding cancer risk [13]	Financial dependence on husband/partner [13]
		Concerned with cost of treatment [13, 16]
		Concern with lack of privacy during exam [13]
		Having a disrespectful provider [13]
		Having a male partner who is not supportive [18] [13]
		Having no symptoms
		Having a male provider [16]
		Experiencing physical discomfort during exam
		Public insurance [26]
		Low education [18] [16]
		Being poor [18]
		Lack of knowledge of cervical cancer screening/guidelines [13, 16, 18]
		Fear/embarrassment of exam [16, 18]
		Relying on family planning/maternal child health clinics to incorporate cervical cancer screening program [5]

In Latin American Countries, the most common barrier was lack of knowledge of cervical cancer and/or cervical cancer screening guidelines [13, 16, 18]. Fewer studies done in Latin America examined which factors facilitate screening, however two studies stated that increased education on cervical cancer and guidelines was a facilitator to screening adherence. Furthermore, two studies found that interventions that use local radio programming to increase

education on cervical cancer and screening guidelines saw increases in screening in the area [14, 31]. In Latin America, a woman's experience with the healthcare system and healthcare professionals appears to play an important role in a woman's screening behavior. Winkler et al. found that women who have had previous positive experiences with the healthcare system, and women who first seek medical attention from a physician (as opposed to self-treating), were more likely to be screened. Additionally, women interviewed about their experiences with screening said having a disrespectful provider was a reason to not to return for screening or follow-up [13].

The most common cervical cancer screening barriers in Asia were being unmarried, and being elderly [11, 17]. Three studies emphasize the importance a reminder system and personal invitations for women to be screened. All three studies found that women were more likely to be screened if they received a personal invitation or reminder to be screened [10, 11, 17].

In Africa, the most common barriers to screening in the literature was having no symptoms [15, 19, 20], and the cost of the test being too high [15, 20]. Two studies in Africa addressed the idea of incorporating cervical cancer screening into existing public health programs. Mwanahamuntu et al. incorporated cervical cancer screening into an existing HIV/AIDS prevention and treatment program and were successful in improving screening coverage in the area. A second study found that relying on family planning/maternal child health clinics was not sufficient in improving screening coverage [21].

While there are differences between the three geographic areas, there are also similarities. Absence of symptoms was a barrier to screening in Asia, Africa, and Latin America, as well as lack of education about cervical cancer and screening practices. In all three regions the idea of

embarrassment, shyness, or fear/discomfort regarding the exam were described as barriers to screening.

Africa was the only area where the barrier of distance to screening center was explicitly addressed, however in Asia the use of a mobile clinic was a facilitator to screening, indicating that transportation/travel had been a potential barrier for this population. Furthermore, reliable public transportation was considered a facilitator to screening in Asia.

In Africa, a study found that the use of family planning clinics as the only or primary source of cervical cancer screening was not effective in improving screening coverage for women who are most at-risk [22]. However a study done in Asia stated that women who were multiparous were more likely to be screened because of their experience with family planning clinics and the healthcare system in general [9].

4.0 SURVEY PROPOSAL

Based on the results of the literature search, there are many barriers and facilitators to screening pertaining to individual populations and geographic region of the world. Societal, community, relationship, and individual level factors affect women's screening behaviors.

4.1 INTRODUCTION

The intent of the proposed survey is to determine the facilitators and barriers to cervical cancer screening of women in rural El Salvador by accessing the knowledge and experience of trained community health promoters.

The following research question will be addressed through this study: what are the barriers and facilitators to cervical cancer screening that influence screening behaviors of women

living in rural El Salvador? This question is based on the experience of the nonprofit organization, Basic Health International (BHI). BHI has worked in El Salvador since 2006 in partnership with the Salvadoran Ministry of Health (MOH), and has worked to improve screening through a multimodal public health approach. However, according to most recent estimates of screening coverage in El Salvador, the rates remain extremely low at approximately 20% (Murillo). In looking at the organization's plans for future interventions, BHI seeks to identify factors that can be improved upon.

4.2 BACKGROUND

Cervical cancer is one of the leading causes of death of women in developing countries, claiming approximately 275,000 lives globally every year, with nearly 90% of those occurring in low-resource settings (who.org). In El Salvador, cervical cancer is the most commonly diagnosed cancer in women with an incidence of 37.2/100,000, (compared to 5.7/100,000 in the U.S.) (iarc.org).

Cervical cancer is a preventable disease, and although it is difficult to treat once it has progressed to advanced stages, there is a long window of time over decades during which precancerous lesions can be easily diagnosed with screening (e.g. cytology, visual inspection with acetic acid, or HPV DNA testing) and can be treated with simple, outpatient methods

In the U.S. and other developed nations, the standard of care for cervical cancer prevention is the Pap smear screening test followed by subsequent treatment of precancerous and cancerous lesions as necessary. The implementation of this preventative screening and treatment strategy into the public health infrastructure has led to a decrease in cervical cancer incidence

and mortality rates in developed countries of nearly 80% over the past 50 years; however the same results have not occurred in developing countries (iarc.org). El Salvador's Ministry of Health has adopted similar guidelines to the U.S. in an effort to decrease cervical cancer mortality in the country. In spite of this, cervical cancer incidence and mortality in El Salvador remains disproportionately high.

Unfortunately, the Pap smear system has not been implemented as effectively in low-resource settings. The Pap smear system requires resources and infrastructure that developing countries often do not have. Cytology requires a great deal of quality assurance monitoring to maintain an accurate standard, as well as trained cytologists and proper equipment. These slides can take weeks to process and in low-resource settings they are often lost or misread. The challenges of implementing this technology in low-resource settings are significant and have led to far too many women continuing to go unscreened throughout their lives [30].

As it has become clear that the Pap smear system is not producing the same results that it has in developed nations, El Salvador, and other countries, have approved the use of an alternative cervical cancer screening method. Many global public health organizations are now opting to use visual inspection with acetic acid (VIA). VIA is a simple procedure in which a healthcare provider applies 3-5% acetic acid (vinegar) to the cervix and looks for areas that change color. Normal cervical tissue is unaffected by the application of vinegar, but damaged tissue, such as the tissue in cervical precancer, turns white with visible borders (basichealth.org).

There are several advantages to VIA. This simple test requires only a flashlight, speculum, an ounce of vinegar, and cotton swabs, and results of the test are available immediately. The advantage of this is that women can then be treated for precancerous lesions the same day that they are screened, limiting the number of women who are lost to follow-up due

to a multi-visit system. Using VIA also eliminates the need for laboratories, does not require transportation of specimens, and medical providers of all levels can perform this procedure – generalist physicians, OBGYNs, nurses, and midwives.

However there are also disadvantages to this alternative screening approach. There is a great deal of variability of sensitivity and specificity of the test. The variability in specificity can lead to unnecessary treatment, and wasted resources. In addition, the test is very subjective and the results can vary depending on the healthcare provider who performs the test. El Salvador has worked to establish guidelines that address VIA use specifically, however VIA protocol varies between countries and there is no worldwide standard.

The Salvadoran Ministry of Health (MOH) along with the nonprofit Basic Health International (BHI) has been working to make cervical cancer screening available to women throughout El Salvador by establishing guidelines for screening and training healthcare providers in low-resource screening techniques, such as VIA. In addition to this, BHI and the MOH have established an education initiative to teach communities about cervical cancer and the importance of screening. Crucial to this education effort, has been the appointment and training of community health promoters.

A health promoter or lay health worker is, "...a member of the community who has received some training to promote health or to carry out some healthcare services, but is not a healthcare professional [32]." Using community members as health promoters is a way of creating a culturally appropriate message that is specific to each community [33]. A respected community member is able to deliver this message in a way that addresses the sensitivity of cervical cancer screening and the unique culture of each community.

To train the health promoters, BHI provides a two-day workshop in cervical cancer prevention and awareness for health promoters throughout El Salvador. On the first day of training, health promoters learn the pathology of Human Papilloma Virus (HPV) infection and its relationship to cervical cancer. Furthermore, health promoters are trained in how these infections are detected (through screening with Pap smear, visual inspection with acetic acid, or the HPV-DNA test), as well as how screening and treatment together prevent cervical cancer. On the second day, BHI presents a variety of strategies for presenting this information to their communities and recruiting women to attend screening. As part of this, the health promoters work in small groups to develop a cervical cancer awareness and prevention campaign tailored to their own community.

In many areas of public health, the use of health promoters has proven to be an effective strategy in providing health education to hard-to-reach populations that leads to improved health outcomes [34-36]. For example, an intervention in Haiti trained community health workers to oversee administration of antiretroviral drugs for HIV positive men and women in their community and showed an improvement in identifying community members in need and adherence to medication schedule [36]. In the U.S. health promoters have been used successfully for cervical cancer screening promotion with immigrant and refugee populations [37, 38]. However, the efficacy of using health promoters to encourage cervical cancer screening in El Salvador has not been studied, and in spite of the efforts of the Salvadoran MOH and organizations like Basic Health International, the Pap smear screening rate for cervical cancer in El Salvador remains very low, at only 19% [39].

Many factors have been identified that influence whether or not a woman is likely to attend cervical cancer screening, including socioeconomic factors such as social standing, and

income, as well as age, literacy rates, job status, a fear of loss of privacy, and marital status [6-8, 15]. In spite of this data on cervical cancer screening barriers, there continues to be a gap in knowledge regarding the specific population that is in need in El Salvador to address the extremely low screening rate and develop a method of improvement.

Specifically in Latin America, facilitators or predictors to cervical cancer screening identified in literature are use of community healthcare agents, use of advertisement campaign for awareness/education, use of local radio programs to promote awareness/education, women first seeking medical attention from a physician when ill, high income, high level of satisfaction from previous healthcare experiences, knowing more women socially who have been screened, supportive male partner, and attending cervical cancer educational events. Barriers or predictors of women not being screened are anxiety about potential bad results, living in a rural area, poor/lack of cervical cancer education from general practitioner, women who self-treat when ill, high patient doctor to patient ratio in population, disregard for one's own health, having no insurance, inconsistent screening guidelines within country, no registry system to keep track of who has been and needs to be screened, poor quality of testing, long wait times at clinic/hospital, financial dependence on husband/partner, concerned with cost of treatment, concern with lack of privacy during exam, having a disrespectful provider, having a male partner who is not supportive, having no symptoms, having a male provider, and experiencing physical discomfort during exam.

Despite the fact that health promoters are in a powerful position to understand and influence their community, health promoters are not often referred to in intervention evaluation [40]. A study on the use of health promoters to improve HIV and TB screening in South Africa

interviewed health promoters and found them to be very useful in identifying barriers to their intervention [40].

The specific aims of this study are:

- To identify barriers to cervical cancer screening amongst women in the Paracentral region of El Salvador
- To identify areas of potential improvement to cervical cancer community education and recruitment techniques
- To test cervical cancer knowledge of Basic Health International-trained health promoters

4.3 RESEARCH DESIGN AND METHODS

4.3.1 Project design

This will be a qualitative study designed to explore the knowledge of health promoters about barriers to cervical cancer screening. The study design is a cross-sectional study.

4.3.2 Measures

The survey instrument consists of seven questions addressing demographics, five knowledge retention questions, and 17 questions that address identifying barriers and improving current programs. The questions on barriers will address a variety of factors including community, relationships, and individual level issues. Transportation, community support, and support of male partners are some of the potential barriers to cervical cancer screening that will be

addressed. Furthermore, using open-ended questions, the survey instrument is also designed to inquire the health promoters' opinions on what would be most effective in improving screening rates, as well as improving community support of women getting screened. Data will be collected through face-to-face interviews with health promoters in a private health clinic setting. Interviews will be audio-recorded to collect qualitative data in addition to the closed-ended questions.

The survey instrument is composed of both closed-ended and open-ended questions that are based on feedback from a focus group of health promoters in El Salvador in February 2012. The survey is expected to take approximately 30 minutes per participant.

4.3.3 Subjects

The target population for this survey is health promoters in the Paracentral region of El Salvador who have received training in cervical cancer by BHI. The sampling frame will be based on current list of the health promoters of this region. Health promoters are full-time employees of the Ministry of Health and serve as community educators on a variety of health topics including cervical cancer. Health promoters have unique experience because they work with the Ministry of Health and Basic Health International, and have a close relationship with the people in their communities. Their perspective is valuable in shedding light on the barriers and facilitators to screening.

4.3.4 Procedures

To select participants for the study, systematic random sampling of 150 health promoters will be drawn from the list of health promoters and asked to participate in the survey. There are 600 health promoters in this region, and a desired sample size of 150 health promoters. Using the technique of systematic random sampling, every 4th person ($600/150 = 4$) will be selected after choosing a random starting point on the list.

Selected participants will receive a letter notifying them that they have been selected to participate in a study for BHI, with a description of the nature and intent of the study. In addition, contact information to set up an interview time will be a part of the letter. Expected participation is high, with an expected participation rate of 80%, because Basic Health has an existing positive relationship the health promoters and the subject of the study will likely be of interest to the health promoters.

Interviews will take place via appointment with volunteer qualitative interviewers at a health clinic in the Paracentral region of El Salvador. Each interview will be one on one in private, closed-door setting and last approximately 45 minutes. Interviews will be recorded and later transcribed and translated. After each day of interviews, the interviewer will upload the recorded files onto a personal computer as well as emailed to the director of operations of BHI in the U.S. where they will be stored in the organization's database.

4.4 PRETESTING

To prepare the interview script and the survey questions, preliminary testing was done in February of 2012. A focus group of 7 health promoters was conducted by a BHI volunteers based on a script written by the principle investigator of this study. The responses to the questions were recorded with pen and paper and used to create answer choices in the final survey. Demographic characteristics were recorded of the health promoters that participated in the focus group.

Table 4: Focus group participant demographics

Participant	Age	Sex	Highest Education	# Yrs as Health Promoter
1	49	F	9 th	2
2	57	F	6 th	2
3	52	F	7 th	2
4	39	F	6 th	2
5	55	F	6 th	2
6	36	F	9 th	2
7	52	M	Bachelor	34

The survey instrument was sent to two members of Basic Health International, and four non-affiliated adults for feedback. In addition, a similar survey instrument was given to 10 students in a graduate school survey methods course to get feedback. Based on the feedback from the graduate students the formatting of the survey was updated, specifically, minimizing the whitespace on the survey by making the margins and space between the questions smaller.

Other feedback addressed inconsistent verb tense usage, period use, and capitalization. The survey was adjusted based on this feedback to make sure that each answer option was consistent in grammar usage and wording. There were also additional formatting issues dealing with the answer choices being aligned. Lastly, it was recommended that the demographic information be placed at the beginning of the survey rather than the knowledge retention so as not to inflict the feeling of an examination at the start of the survey.

4.5 METHODS OF ANALYSIS

Immediately after data is collected, data will be cleaned by looking over the surveys to identify any unclear or incorrectly marked answers. A profile of the participants will be created using descriptive statistics of the demographic data collected. Next, the initial analysis of data will include identifying any nonresponse bias based on specific unit nonresponse. A comparison of the demographics of those who participated in the survey versus those who did not, as well as any particular question that was not answered will be executed. Any questions that are consistently not answered will be considered missing data and ignored rather than imputed. The questions that are closed-ended will be assigned number values for analysis, such as those using the “strongly disagree” to “strongly agree” scale.

Once data is transcribed and recorded on a computer, it will be cleaned using statistical computer software to indicate any missing data. This will include running cross-tabulations and frequencies. Any question that yields a great deal of nonresponse, likely indicates a poorly worded questions and will not be used [41].

Open-ended questions will be transcribed and analyzed for common themes and coded. One person will likely do all of the data encoding, however if a second person is available, then double encoding will be used to minimize bias. A decision logic model will be developed to ensure that decisions about data coding are consistent throughout the analysis.

Univariate descriptive statistics will be used in data analysis to describe the general characteristics of the participant population, as well as the responses to closed-ended questions. Bivariate and multivariate statistics will be used to test the relationships between some of the variables, depending on the results of the survey. For example, health promoters will be asked what part of the Paracentral region that they are responsible for teaching. Bivariate statistics will be used to test for correlation between and responses, such as which education session they would consider the most successful, if transportation is a major barrier, and if cost is a major barrier. Secondly, the researcher will also test the relationship between the knowledge retention scores and demographic factors, such as number of years as a health promoter, education level, or how many times the health promoter has taught on the subject of cervical cancer. More details of the statistical analysis will be determined after data is collected to look for potential trends in the data. Finally, survey analysis will be conducted to relate the analysis results back to the original objectives of the study.

5.0 IMPLICATIONS

This survey was designed to improve BHI's understanding of the people that they aim to reach with their cervical cancer eradication campaign. The background and literature review have demonstrated that there are a wide range of potential barriers and facilitators in any given

community. It is important for BHI to understand the culture of the people that they serve and the obstacles that they face in order to improve the very low national screening rate. This research will seek to improve this understanding and shape future interventions for screening and decrease cervical cancer mortality rates.

6.0 LIMITATIONS

While the data that were found in the literature search were from developing countries, there seems to be certain areas of the world where research on cervical cancer is being done consistently, however many developing countries show little or no published research in cervical cancer. One of these areas where there is little research available is Central America and the Caribbean. Due to drastic cultural and geographical differences, it is questionable whether or not the data from countries such as India and Thailand can be applied to El Salvador. Furthermore, some studies were excluded from the literature search because they were not considered low-income according to the World Bank's classifications. However, some of these countries although wealthier, have significant disparities in wealth and health distributions and would likely have been relevant to the development of this paper.

Another limitation is that screening coverage rates reported in developing countries are not always based on accurate data collection. This made it difficult for the researcher to cross-reference data in studies to check for accuracy.

The researcher has a significant experience in literature searches using Pubmed; however was less familiar with other search engines which may have resulted in missed articles that otherwise would have been applicable to this paper. Not all of the studies included all levels of potential barriers and facilitators in their study. As a result, it is difficult to say whether a study

has ruled out a certain factor as having an influence on screening behavior, or if the it was simply not tested in that particular study. Ten out of 37 articles that were found to be relevant were excluded from the study simply because they were not available to the researcher for free. The researcher would consider this a limitation given the relatively small number of articles that were available and met all inclusion criteria.

One of the limitations to this paper is that no data has been collected to date using the proposed survey. Some of the papers that were found in the literature search were unavailable to the researcher or in a language unknown to the researcher. The studies that were identified in the literature search relied mostly on self-report to measure women's screening habits. This method is not as reliable as having as referring to a screening database, and may have some bias in the results of these studies.

The completion of this literature search has demonstrated that there are significant gaps in knowledge of cervical cancer screening barriers and facilitators in developing countries. In order to improve access to screening and develop programs to achieve this, an accurate assessment of the problems at hand needs to be performed. It should be the goal of ministries of health and nonprofit organizations to collaborate to create an up-to-date database of screening histories and coverage rates of their populations.

7.0 CONCLUSIONS

The literature search was useful to the design of the survey, especially in developing the focus group script. Many of the questions were formulated based on the literature review as well as

anecdotal evidence from individuals who work for Basic Health International and have experience with the patient population.

The information gathered from the literature search indicates that cultural differences as well as discrepancies in screening guidelines and health policy in general has led to a unique profile of women in different regions of the world.

While reviewing the literature, the researcher saw several areas of potential improvement through public health intervention. Joining the success of the public radio as an educational tool, as well as the personal invitation system could potentially reach women that are being forgotten by one or the other approach alone. The literature search also revealed that there are women who are being missed by cervical cancer campaigns and should be addressed. For example, a campaign that addresses single adult women, especially in Asia, and encourages them to be screened, may reach a neglected part of the at-risk population.

The importance of understanding the population is clear based on the literature review, however surprisingly, there is an indication that providers are not always doing their part to make women feel comfortable in the screening environment. This is another area of possible intervention. There is the potential to improve cervical cancer screening by providing appropriate training to healthcare providers in how to make women feel comfortable throughout the process of screening.

An important outcome of this literature search is the development of a profile of what a “high-risk” woman might look like in different regions of the world. While the literature search revealed that there are multiple levels and channels through which public health professionals can intervene, the individual level factors paint a picture of who is least likely to be screened. In looking forward, there is a possibility of targeting women for intervention using these profiles.

It is incredibly important to identify barriers and facilitators to cervical cancer screenings. Well-executed research is the foundation of successful public health programs and cervical cancer screening is no exception. This is especially important in low and middle-income countries where resources are scarce. Additionally, the nonprofits that work in these settings often have limited resources and need to maximize the number of people that they can reach.

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